

INVENTORY CONTROL SYSTEM AND METHOD ESPECIALLY FOR PHARMACEUTICALS

FIELD OF THE INVENTION

The present invention generally relates to storage receptacles for small items. The invention particularly concerns access control and inventory monitoring of small items such as pharmaceuticals, especially controlled substances. The invention specifically relates to inventorying and controlling the access to bulk supplies of controlled substances.

BACKGROUND OF THE INVENTION

A wide variety of containers have been developed for packaging and storage of small items. These include boxes, bags, blister packs and bottles, to name a few. In each case, the container houses an integral number of units of the items to be stored which number is dictated by the volume of the container and the size of the item to be stored. Many of these containers further have means to open and close so that items may be placed in and removed from such containers. Access is available to the contents of such containers by anyone who has access to the container itself.

Many pharmaceutical preparations are formulated into dosages configured as pills, tablets, capsules and the like. Typically, a dosage size of these pharmaceuticals is small so that they may be conveniently swallowed by the patient. A treatment regimen typically lasts over a course of several days or more, and these medications to be taken at a specified time. Thus, a plurality of doses of such medications needs to be maintained by or for the patient. It has therefore been known to commonly store such medications in receptacles such as bottles, boxes or other containers well known in the art.

Many pharmaceuticals are known to be potent chemical compounds that have significant impact from the physiology or psychology of a person who ingests the compound. For this reason, in some cases, containers are provided with an access control mechanism as a barrier to access to the contents of the container. For example, it is often desirable to prevent small children from opening bottles that contain medications. A wide variety of releasable cap structures have been developed that are constructed to thwart efforts by a small child to open the

container yet which allow a savvy, more dexterous person the ability to access the contents thereof.

It is also known to employ anti-tampering devices with a variety of containers. These devices are in the form of one-time seals which must be removed before access to the contents of the container may be had. One example of such a one-time seal is a simple membrane that is placed over the mouth of a bottle and adhered into place prior to mounting of the cap on the bottle. While the cap may readily be removed, the seal must be broken before access to the items stored in the container is available. Another example of such a seal is the placing of a shrink-wrap plastic which engages both a portion of both a bottle and a cap so that, in order to remove the cap, the plastic seal must be removed. Some caps for bottles are provided with engagement structures as part of a tear-away tab so that, in order to remove the cap once it has been placed on the bottle, the tear-away tab must be removed.

All of these structures are quite useful and effective for protecting the contents of a single bottle. Once the seal is broken, however, there is no way of controlling access to the contents of the bottle. Often, this does not prove to be a major issue since only a small number of doses of a pharmaceutical, for example, are contained within the bottle. The monitoring an inventory of such a small quantity presents little difficulty since the number of units may simply be counted in order to determine how many doses have been taken in the past and how many doses remain.

One drawback in the packaging of doses of medication in small bottles is the attendant cost to the patient. Accordingly, many medications are packaged in bulk or are available for bulk purchase by a patient in an effort to reduce costs of medical treatment. While with some cases, this does not present a problem, there are many times that the availability of bulk doses can create administrative nightmares. This typically arises where the pharmaceutical is a highly controlled substance.

It is known that many substances, such as narcotics, are not only used for legitimate medical purposes but are also sought after for the perceived pleasurable effect the narcotic generates when taken into the body. Accordingly, where such compounds are available, such as in hospital settings, access and inventory of such controlled substances is tightly controlled. It is known to keep such substances under physical lock and key. Nonetheless, it is also necessary to allow numerous caregivers access to such substances as a normal adjunct of day-to-day treatment of

the patients. Theft of the controlled substances is not an uncommon occurrence, and it is difficult to monitor due to the number of persons who may have access to the controlled substances.

In an effort to monitor such substances, tracking systems have been developed. A caregiver records the accessing of the compounds by counting and recording on a count sheet the number of doses available, the number of doses taken, and the number of doses remaining. This requires physically counting the doses in a bottle each time the medication is administered and then checking this count to the previous data on the count sheet. All this presents a minor inconvenience when only a small number of doses are present in the bottle. It becomes a time consuming and inefficient task when the medications are available in bulk.

As noted above, patients seek to reduce the cost of their medications by purchasing bulk quantities in those circumstances where treatment is anticipated to be over an extended period of time. When such treatment includes controlled substances, the bulk purchase of the controlled substance, while on the one hand reduces cost to the patient, bulk purchase on the other hand increases the burden of administration. Where patients acquire a bulk quantity of the controlled substance, it is much more difficult to determine a misappropriation of the medication. In order to inventory the compounds, the caregiver must count as many as several hundred units each time there is a change in the identity of the caregiver. The difficulty of the task increases linearly with the number of patients that a group of caregivers must oversee since the supply of each medication is kept separately according to each patient. Moreover, while standard practice is to have two caregivers in attendance each time access is permitted to the controlled substance in order that one caregiver may oversee another, the time spent inventorying the controlled substances becomes inefficient at the least and often is unmanageable.

Accordingly, there has been a long-felt and increasing need for precise inventory control over small items. There has been an increasing need for methods and apparatus which can control access to and the inventory of small items, especially doses of medication and in particular medications that constitute controlled substances. There remains a need for devices and methods which can effect time savings in the inventorying of controlled substances so as to diminish the burden of inventorying on the caregiver and thus allow the caregiver more time to

administer to the needs of the patients. The present invention is directed to these needs.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a new and useful inventorying system and method for monitoring the inventory of small items.

It is another object of the present invention to provide a new and useful system and method especially directed to the monitoring of access and inventory of medications in the form of controlled substances.

A further object of the present invention is to provide a receptacle and receptacle sealing structure which may be employed in an inventory system for controlled substances.

Still a further object of the present invention is to provide a method and system for placing a bulk quantity of doses of medication in a plurality of receptacles of reduced quantity in such a manner both to correlate the plurality of receptacles to a specific patient while at the same time increasing the ease of monitoring and controlling access to the contents thereof.

According to the present invention, then, an inventory control system contains and stores items. The inventory control system includes a plurality of receptacles each having an interior adapted to receive a selected quantity of the items therein with a mouth that is operative to permit access to the interior. A lock member is adapted to lock two of the receptacles together in an stacked array to define a joined state such that there is a lower receptacle and an upper receptacle. The lock member is operative to prevent access to the interior of the lower receptacle when in the joined state. The lock member is partible so it can be removed to release the lower and upper receptacles from one another thereby to allow access to the interior of the lower container. In several of the embodiments, the lock member includes a tear-away portion that can be removed.

The receptacles can each have a surrounding sidewall and a bottom wall opposite the mouth. Alternatively, the receptacles are constructed as tubular members of a selected cross-section with the tubular members including a surrounding sidewall at opposite open ends. Here, the lock member includes a central wall that defines a bottom wall for the upper receptacle when in the joined state. In either case, the receptacles have a geometric cross-section selected from a group consisting of circles, ovals and polygons.

In some embodiments, the receptacles threadably mate with one another. Here, for example, each receptacle can include a container portion and a threaded mouth portion joined thereto. The lock member is then adapted to threadably mate onto the threaded mouth portion. Each such receptacle may be provided with radially outwardly projecting first teeth. The lock member then includes radially inwardly projecting second teeth disposed on the tear away portion with the first and second teeth adapted to interlock with one another to prohibit unthreading of the lock member from the receptacle. Alternatively, where the mouth portion is joined to the container portion and extends coaxially therewith the former shoulder, each receptacle can include a plurality of first teeth disposed on the shoulder and projecting longitudinally thereof. The lock member then includes longitudinally projecting second teeth disposed on the tear away portion and adapted to interlock with the first teeth in the joined state.

Other embodiments of the receptacle and lock member are disclosed. The lock member may be adhered to the receptacle at an end opposite the mouth thereof. The receptacle may be provided with a plurality of eyelets and the lock member being at least one cable tie sized and adapted to extend through the eyelets on the upper and lower receptacles to lock them together.

In several of the embodiments, each receptacle includes a circumferential first outer ridge projecting outwardly therefrom. This first outer ridge has a ramp face and a locking face. The lock member then includes a circumferential inner ridge projecting inwardly therefrom. This inner ridge also has a ramp face and a locking face such that, when a locking member is advanced onto a receptacle, the ramp faces engage one another until sufficiently advanced to interlock the locking faces when they advance past one another. The locking faces thereafter engage one another to prevent separation of the locking member from the receptacle. This inner ridge is disposed on the tear-away portion of the lock member so that removal of the tear-away portion disengages the lock member from the receptacle in a destructive manner.

If desired, the receptacle can include a circumferential second outer ridge. Here, the first outer ridge is located proximately to the mouth of the receptacle and the second outer ridge is located proximately to a second end portion of the receptacle opposite the mouth. This second outer ridge projects outwardly from the receptacle and again has a ramp facing the locking case. The lock member then

includes a circumferential second inner ridge projecting inwardly therefrom with the second inner ridge also having a ramp face and a locking face. Thus, a lock member may be advanced onto an adjacent pair of receptacles with the ramp faces on the inner ridges of the lock member respectively engage the ramp faces on the first and second outer ridges until the respective locking faces advance past one another. The locking faces thereafter engage one another again to prevent separation of the lock member from the adjacent pair of receptacles and thereby to prevent separation of the adjacent pair of receptacles. Here, also, the lock member can include first and second tear-away portions with the first and second inner ridges being disposed respectively on their first and second tear-away portions.

A lid member may be provided with the lid member adapted to be selectively secured to and removed from each of the receptacles thereby respectively to enclose and prevent access to the interior thereof. Where the mouth portion is provided with an outwardly projecting ridge, as described above, the lid member may be adapted to engage the ridge. Here, the lid member is formed of a resilient material so that it may be snap fit onto the first outer ridge.

The present invention also discloses a method of storing a bulk aggregate quantity of items in selected sub-quantities for inventory, control and dispensing. This method includes a first step of placing a selected sub-quantity of the items in the interiors of each one of a plurality of receptacles. The method also includes the step of interlocking the plurality of receptacles in a stacked array such that there is an uppermost receptacle. This step is accomplished in such a manner so as to prevent access to the interior of each receptacle except for the uppermost receptacle when in a joined state. Adjacent receptacles in this stacked array are interlocked by a lock member so that adjacent receptacles may only be separated from one another by destroying a lock member. The method can also include the step of providing a reusable lid member to enclose the interior of the uppermost receptacle. The method may include the step of dispensing first the sub-quantity of items in the uppermost receptacle and thereafter separating the uppermost receptacle from the stacked array such that an adjacent receptacle becomes the uppermost receptacle in the stacked array. This method is particularly suited where the items to be stored and dispensed are pharmaceuticals, such as controlled substances.

These and other objects of the present invention will become more readily appreciated and understood from a consideration of the following detailed

description of the exemplary embodiments of the present invention when taken together with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of an inventory control system according to a first embodiment of the present invention using receptacles according to a first exemplary embodiment;

Figure 2 is an exploded perspective view of a pair of receptacles and a lid therefor used in the system of Figure 1;

Figure 3 is a side view in elevation, partially broken away, of the receptacles of Figure 2 used in the system of Figure 1;

Figure 4 is a perspective view of an inventory control system according to a second exemplary embodiment of the present invention and receptacles used therefor;

Figure 5 is an exploded perspective view of a pair of receptacles and lid used in the system of Figure 4;

Figure 6 is a top plan view of a receptacle such as shown in Figure 5;

Figure 7 is a side view in elevation, in partial cross-section, showing the mating of a pair of receptacles such as those shown in Figure 5;

Figure 8 is a perspective view of a third alternative lock structure used to join a pair of receptacles according to a third exemplary embodiment of the present invention;

Figure 9 is a side view in elevation partially broken away and in partial cross-section showing the lock member of Figure 8 joining a pair of receptacles according to the third exemplary embodiment of the present invention;

Figure 10 is an enlarged cross-sectional view showing the pair of receptacles of Figure 9 joined by a portion of the lock member of Figure 8;

Figure 11 is a side view in cross-section, similar to Figure 10, but showing the pair of receptacles prior to their being sealed together;

Figure 12 is a side view in cross-section showing a representative lid that can be used with the receptacles of Figure 9;

Figure 13 is a perspective view of yet another lock member used in a fourth exemplary embodiment of the present invention;

Figure 14 is a side view in elevation of a portion of the pair of receptacles used in the fourth exemplary embodiment of the present invention;

Figure 15 is a side view in cross-section of a portion of a pair of receptacles shown in Figure 14 being sealed by the lock member of Figure 13;

Figure 16 is an exploded isometric view of a pair of receptacles, a lock member and a lid member according to a fifth exemplary embodiment of the present invention;

Figure 17 is an exploded perspective view, partially broken away, illustrating an uppermost receptacle to be provided with a lid member and showing an adjacent receptacle with a lock member secured to the mouth portion thereof and with another lock member having one tear-away portion removed therefrom mounted on a bottom portion of the receptacle;

Figure 18 is a cross-sectional view of a receptacle used with the inventory control system of Figures 16 and 17

Figure 19 is a cross-sectional view of the lid member used with the inventory control system of Figures 16 and 17;

Figure 20 is a side view in cross-section showing the lock member used with the inventory control system shown in Figures 16 and 17;

Figure 21 is an isometric view of the sixth exemplary embodiment of the present invention wherein the receptacles are in the form of tubular members and with the lock member providing a bottom wall for a respective receptacle;

Figure 22 is a cross-sectional view of a pair of receptacles and two lock members, one with a tear-away portion removed according to a sixth exemplary embodiment of the present invention;

Figure 23 is a cross-sectional view of an alternate lock member that may be used with the embodiments of Figures 16, 17, 21 and 22; and

Figure 24 is an exploded view in cross-section illustrating a seventh embodiment of the present invention.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

The present invention broadly relates to receptacles that may store small items, but the invention is particularly directed to an inventory control system and method for small items in the form of doses of medications. It is particularly directed to the repackaging by a caregiver of a bulk supply of a controlled substance for a particular patient in a manner that reduces certain costs attendant to the management of those medications such as might be found in a hospital setting. While the invention is described with respect to such medications, it should be

understood that the invention may be used in any situation requiring the storage and/or inventory control of small items.

In order to understand the inventory control system according to a first exemplary embodiment of the present invention, reference is made first to Figure 1 wherein inventory control system 10 includes a plurality of receptacles 12 that are ganged together to create a linear "stacked" array. With continued reference to Figure 1 but with addition reference to Figures 2-3, it may be seen that receptacles 12 are each identically constructed so as to have a container portion 14 that includes a surrounding sidewall 16 and a bottom wall 18 to define an interior 20 therein. Interior 20 is provided to receive a plurality of small items, such as doses of medication. The universal lid 22 is also provided with lid 22 adapted to mate with any one of the receptacles 12.

A plurality of receptacles 12 may be assembled in a co-axial linear or stacked array to form inventory control system 10, as is shown in Figure 1. Here, three separate receptacles 12 are illustrated (one being shown in phantom). To allow the formation of this array, it may be seen in Figure 3, that sidewall 16 of a representative receptacle 12 includes an upper sidewall section 24 that is of a slightly larger diameter than a lower sidewall section 26. This forms a shoulder 28 at the junction of sidewall sections 24 and 26. The outer upper sidewall section 26 for each receptacle 12 is cylindrical in configuration, and the outer cylindrical portion of lower sidewall section 26 is provided with threads 30.

As is best shown in Figure 2, an upper portion of receptacle body 14 has threads 32 located adjacent to rim 34 on the interior circumferential surface of upper sidewall section 24 adjacent rim 34 that forms a mouth portion. Threads 32 are compatible with threads 30. Accordingly, two adjacent receptacles 12 may be threadably mated with each other by engaging threads 30 with 32 and screwing the receptacles together until rim 34 abuts shoulder 28. In this manner, each interior 20 of a receptacle 12 may be enclosed by the bottom wall 18 of an adjacent receptacle 12. An endmost receptacle 12 has a mouth 21 that is then enclosed by means of lid 22 that is provided with compatible threads 38 which mate with threads 32 of an endmost receptacle.

Each receptacle 12 is provided with a plurality of eyelets 36 which form openings 40 therein. Eyelets 36 are equal angularly spaced around the outer circumferential wall of receptacle body 14, and the axial depth of lower sidewall

section 26 is selected so that, when two receptacles 12 are ganged together, eyelets 36 align longitudinally in the direction of longitudinal central axis "L". This is illustrated in Figure 1.

When a plurality of receptacles 12 are formed in the stacked array to form inventory control system 10, then, each longitudinally adjacent pair of eyelets 36 is aligned and may be secured together, for example, by lock members in the form of cable ties 50 each of which, as is well known, has a locking head 52 that engages and end of strap 54 so that, once fastened, the cable tie cannot be released without violating its integrity. In this manner, each pair of adjacent receptacles 12 may be secured together and cannot be separated until their respective cable ties 50 are destroyed by being severed. Access is then permitted only to the uppermost receptacle 12 by removing lid 22 from mouth 21 to access the contents of that uppermost receptacle 12.

It should now be appreciated that any desired number of receptacles 12 may be ganged together into the assembled array to create the inventory control system of the present invention. For example, should a patient purchase a bulk quantity of doses of medication, for example 240 units, a caregiver may separate the bulk quantity into smaller numbered groups, such as groups of 30 doses. Thirty doses can then each be placed in eight receptacles 12, and the eight receptacles 12 ganged in the stacked array. The caregiver may then lock together adjacent ones of the receptacles by inserting cable ties 50 to prevent access to all but the endmost receptacle that is enclosed by lid 22. Unauthorized access can thus be monitored and observed should any of the lock members in the form of cable ties 50 be severed. The caretaker needs only to count the doses in the endmost receptacle so long as the integrity of cable ties 50 obtains.

While the structure of the receptacle system 10 shown in the first exemplary embodiment of the present invention is quite suitable for accomplishing the purposes of the present invention, a person desiring unauthorized access to a sealed receptacle for purposed of avoiding doses of medication might be able to unseal the receptacles and reseal them with new cable ties 50 so as to avoid detection. Accordingly, a second exemplary embodiment of the present invention is illustrated in Figures 4-7.

As is shown in Figures 4 and 5, inventory control system 110 is provided wherein a plurality of receptacles 112 may be again ganged together in a stacked

linear array along longitudinal axis "L". Here, each receptacle 112 has a receptacle body 114 formed by a cylindrical surrounding sidewall 116 and a bottom wall 118 so as to define an interior 120 having a mouth 121. An upper portion of sidewall 116 includes an upper mouth portion 124 of reduced diameter which is externally threaded by means of threads 130. The junction of this upper sidewall section 124 with a lower sidewall section 126 forms a shoulder 128 that is provided with a plurality of wedge shaped protrusions or teeth 136 extending at equal angularly spaced locations therearound, as is shown in Figure 6, and projecting in a longitudinal direction. Each of teeth 136 has a sloped ramp face 137 and a perpendicular lock face 139. A lid 122 is provided to engage upper sidewall section 124 of each receptacle 112 by having compatible threads to engage threads 130. However, lid 122 is dimensioned so as not to engage teeth 136.

A lock member 150 is located at an end of each receptacle 112 opposite its mouth 121. Lock members 150, which are formed of a first section 152 and second section 154 are best illustrated in Figure 7. First section 152 includes an end wall 156 that has a cylindrical flange 158 thereby defining a cup shaped configuration that is adapted to mateably receive the end of a receptacle 112. First section 152 is permanently affixed to its respective receptacle 112 for example by an adhesive, ultrasonic welding, or any other technique known in the art. The internal sidewall of first section 152 is provided with threads 132 that are compatible with threads 130 on an adjacent receptacle 112. Second section 152 of lock member 150 is affixed to first section 152 around a circumferential score line 160. Further, second section 154 includes a plurality of wedge-shaped protrusions or teeth 162 along its lower edge 164. Teeth 162 project in a longitudinal direction, and each has a ramp face 162 and a lock face 165.

Lock member 150 is thus configured that it may be advanced onto an adjacent receptacle 112 by mating threads 132 onto threads 130 of the adjacent receptacle. As the lock member is advanced onto an adjacent receptacle, teeth 162 will engage teeth 136 on shoulder 128 of the adjacent receptacle. During the threading motion, the ramp faces will slide across one another so that complete threaded engagement may be accomplished. However, any attempt to reverse this process will result in the lock faces engaging one another thereby preventing the unthreading of a lock member 150 from an adjacent receptacle 112. Any attempt to detach the two adjacent receptacles, then, will sever first and second sections 152

and 154 of lock member 150 about score line 160 so that section 152 and 154 are partible. This naturally will allow access into the receptacle sealed by lock member 150 but also serves to destroy lock member 150 as an indicator that access has been obtained. This would then signal a caretaker that unauthorized access has been attempted and/or accomplished and signal the caretaker to inventory the contents of the respective receptacle. At the same time, at such time that authorized access is desired, it is a simple matter to detach and discard the used receptacle 112 to access the next adjacent receptacle in which has been stored a reduced quantity of a bulk supply of dosages of medication. Lock member 150 and teeth 136 are analogous to sealing structures commonly used to seal caps onto beverage receptacles.

A third exemplary embodiment of the present invention is shown in Figures 8-12. In this embodiment, a locking member 250 is used to seal two bottle like receptacles 212, one to another to accomplish the system described above. Here, again, receptacles 212 are formed by a receptacle body 214 including a surrounding sidewall 216 that includes a bottom wall 218. Sidewall 216 includes an upper cylindrical sidewall section 224 and a lower sidewall section 226 of reduced dimension. Lower sidewall section 226 is provided with a circumferentially extending rib 230 on the exterior surface thereof. Rib 230 includes an angled wall 231 and an undercut 233, the purpose of which is described more thoroughly below. Upper sidewall section 224 opposite bottom wall 218 is provided with an upper mouth wall 225 that is cylindrical in shape and has a diameter that is the same as lower sidewall section 226. Moreover, mouth sidewall section 225 includes a rib 240 extending on the exterior surface thereof with rib 240 having a slanted wall 241 and an undercut 243 again the purpose of which is described more thoroughly below. An external flange 245 extends around mouth sidewall section 225 adjacent rim 234 thereof.

Lock member 250 is best illustrated in Figures 8, 9, 10 and 11 and is formed by partible first and second sections 252 and 254 which are mirror images of one another and which are connected to one another by means of a peel strip 270 which may be selectively severed from the respective sections 252 and 254 along score lines 260 and 261 thereof. With reference to Figure 11, it may be seen that lock member 250 has a pair of inwardly projecting ridges 272 formed of each end thereof with ridges 272 and 273 located proximate to edges 274 and 275 thereof. Each of ridges 272 and 273 include undercuts 276 and 277 respectively. It may now be

appreciated that, when two adjacent receptacles 212 are to be mated, the bottom portion of one receptacle is engaged with one end of locking member 250 so that rib 230 engages ridge 272 so that undercuts 233 and 276 interlock with one another preventing disengagement of the lock member from the bottom of receptacle 212, once assembled.

Similarly, the mouth of an adjacent receptacle 212 may be inserted into the opposite end of lock member 250 so that rib 240 engages ridge 273 with undercut 243 interlocking with undercut 277 to prevent disengagement of the second receptacle 212 once it has been engaged with lock member 250. This engagement is shown in Figure 10. It may further be appreciated that, once engaged, the two adjacent receptacles 212 may not be separated from one another until such time that peel strip 270 is torn away to sever first and second sections 252 and 254. Moreover, it may be seen that the internal wall of peel strip 270 has a shallow channel 280 that is sufficient to accommodate the projection of flange 245.

In use, then, the caregiver separates a bulk quantity of dosages of medication and places a selected quantity in each of receptacles 212. Once this is done, the caretaker engages adjacent ones of the receptacles 212 by means of a lock member 250. Thus, one receptacle 212 seals the interior of an adjacent receptacle with only the uppermost end receptacle having a quantity of medication available for dispensing. This uppermost receptacle may be enclosed by a conventional cap 290, illustrated at Figure 12. Cap 290 is formed of a flexible material and includes an end enclosure 292 and a downwardly depending sidewall 294 that is sized to mateably receive the mouth wall 225 of a receptacle 212. An inwardly projecting ridge 296 is provided to releasably engage flange 245, as is known in the art.

When a quantity of medication is exhausted from the accessed uppermost receptacle 212, the caretaker simply removes peel strip 270 so as to access the next adjacent receptacle with the newly access receptacle being enclosed by the cap 290. The used receptacle may then be discarded. This process is repeated with the caretaker only needing to inventory the quantity of medication that is available in each sequential receptacle only when the respective receptacle is accessed.

A fourth embodiment of the present invention is illustrated in Figures 13-15. Here, a lock member 350 is provided to interconnect adjacent receptacles 312. Here, each receptacle 312 includes a receptacle body formed by a sidewall 316 and a bottom wall 318 sidewall 312 is formed by an upper section 324, a lower section

326 and a mouth section 325, similar to that described with respect to receptacles 212. Here, however, bottom sidewall section 326 is provided with threads 330 and a plurality of gear-like teeth 336 located on the exterior thereof proximate to a shoulder 329. Each tooth projects radially outwardly and is formed by a ramp face 337 and a lock face 339. Similarly, mouth sidewall section 325 includes threads 332 and a gear like external rib 333 formed by a plurality of teeth again projecting radially outwardly and having inclined ramp faces and perpendicular lock faces. A gear like rib 333 is located adjacent a shoulder 335.

Two receptacles 312 may be interconnected by means of a lock member 350 which includes a primary cylindrical wall 352 and a pair of peel strips 370 located at opposite ends thereof. The interior of locking member 350 is threaded compatibly with threads 330 and 332 so that a pair of adjacent receptacles 312 may be secured together. Moreover, the interior surface of each peel strip 370 is provided with gear like teeth 372 on the interior thereof that project radially inwardly. When receptacles 312 are threaded into locking member 350, gear teeth 372 engage the teeth of ridges 333 and 336 to lock locking member 350 against counter rotation with respect to each receptacle 312. This, then, locks adjacent receptacles together until such time that they may be disengaged by pulling peel strips 370 to sever peel strips 370 from central 352 along score lines 360.

The use and operation of this fourth exemplary embodiment of the present invention should be now well understood from the foregoing description. The caretaker can again separate a bulk supply of medication into smaller quantities and store smaller quantities in respective receptacles 312. Access to an end receptacle is provided with a standard type cap, but access to the remaining receptacles is denied due to the presence of seals 350. This maintains until a respective seal 350 is removed by means of peel strips 370. Thus, access may be monitored and violation of the integrity of the seal system observed.

A fifth exemplary embodiment of the present invention is illustrated in Figures 16-19. Here, inventory control system 410 includes a plurality of receptacles 412 that are rectangular in cross-section. Receptacles 412 each includes a container portion 414 formed by surrounding sidewall 416 and a bottom wall 418 to define an interior 420. A mouth portion 424 is joined to container portion 414 and extends coaxially therewith to form a shoulder 425. Top or mouth portion 424 provides a mouth 421 communicating with interior 420. Bottom portion 426 is also coaxial with

container portion 414 and is joined thereto to create a shoulder 427. Mouth portion 424 has a circumferential first outer ridge 430 that includes a ramp face 431 and a locking face 432. Bottom portion 426 is provided with a circumferential second outer ridge 434 that also includes a ramp face 435 and a locking face 436. Each of ridges 430 and 434 project outwardly from the respective mouth and bottom portions.

A lock member 450 is best shown in Figure 20 and includes a central wall 452. A first tear-away strip 454 is disposed on one side of central wall 452, and a second tear-away strip 456 is disposed on the other side of central wall 452. Tear-away strips 454 and 456 have score lines 458 so that they may be easily torn away from lock member 450. Tear-away portion 454 is provided with an inwardly projecting first inner ridge 460 that includes a ramp face 461 and a locking face 462. Likewise, second tear-away portion 456 is provided with a circumferential second inner ridge 464 that includes a ramp face 465 and a locking face 466.

When lock member 450 is used to interlock a pair of adjacent receptacles 412, as illustrated best in Figure 17, first inner ridge 460 will interlock with second outer ridge 426 and, similarly, second inner ridge 464 will interlock with first outer ridge 430. As is also illustrated in Figure 17, when this occurs, the outer surface 468 of locking member 450 is coextensive or flush with the outer surface of surrounding sidewall 418.

To accomplish this interlocking, the respective ramp faces on the inner ridges will slideably engage the ramp faces on the respective outer ridges until the lock member is advanced efficiently so that the locking faces extend past one another. When this occurs, the locking faces will engage one another to prevent separation of the respective receptacle 412 from the respective locking member 450. Only by destroying locking member 450 such as by removing a selected tear-away portion 454 or 456 can the pair of adjacent receptacles 412 be separated from one another. For example, as is shown in Figure 17, a lock member 450' is shown with tear-away portion 456 removed therefrom.

The inventory control system of Figures 16-20 may also include a lid member 470 best shown in Figure 19. Lid member 470 includes a circumferential inner rib 472 that will snap fit onto mouth portion 424 by engaging outer ridge 430 or mouth portion 424. To this end, lid member 470 may be formed of a resilient material. Naturally, other lid members well known in the art could be used.

A sixth exemplary embodiment of the present invention is illustrated in Figures 21 and 22. Here, it may be seen that the inventory control system 510 includes a pair of receptacles 512 adjacent ones of which may be interconnected by a lock member 550 which is of similar construction to locking member 450 discussed above. In Figures 21 and 22, receptacles 512 are cylindrical and have a cylindrical surrounding sidewall 516 and a bottom wall 518 so as to have an interior 520 with a mouth opening 521 opposite bottom wall 518. A first outer ridge 530 extends circumferentially around the outer surface of sidewall 516 on a mouth portion of receptacle 512 proximately to mouth 521. A second outer ridge 536 extends circumferentially around sidewall 516 on an outer surface thereof and a bottom portion of receptacle 512 proximately to bottom wall 518. Each of ridges 530 and 534 has a ramp wall 531 and 535 and a lock wall 532 and 536, respectively.

It should be appreciated that the interlocking structure of the inventory control system 510 differs from that shown with inventory control system 410 in that ridges 530 and 534 are not located on coaxial inset portions of smaller dimensions that form mouth portion 424 and the bottom portion 426. Accordingly, as is illustrated in Figure 22, the outer surface of lock member 550 extends outwardly of the outer surface of sidewall 516 instead of being flush therewith. Lock member 550 again includes first and second inner ridges 460 and 564 which again have ramp faces and locking faces to interlock with respective ridges 530 and 534. Accordingly, an explanation of this interlocking action is not again repeated. Lock member 550 has a central wall 552 with ridges 560 and 564 respectively being located on tear-away portions 554 and 556.

Since receptacles, such as receptacles 412 and 512 have bottom walls, it is not necessary that the respective lock member includes a central wall portion. Thus, as is shown in Figure 23, an alternative lock member is illustrated in cross-section as lock member 590. Here, the central wall is replaced by an inwardly projecting flange 592 that has an opening 593 therein. Lock member 590 is again provided with a first locking ridge 594 located on a tear-away portion 596 and a second lock inner circumferential ridge 598 located on tear-away portion 599.

Finally, Figure 24 illustrates another embodiment of the present invention in the form of inventory control system 610. Here, the receptacles 612 are formed by tubular container portions 614 formed by a surrounding sidewall 616 with opposite open ends to form openings 621, either of which may serve as a mouth opening.

Outer locking ridges 630 are located proximately to open ends 621 on the outer surface of sidewall 616. Locking member 650 is constructed the same as locking member 550 so that its central wall portion 552 forms a bottom for a container portion 614 when joined thereto.

While the foregoing structures show exemplary embodiments of the present invention, it should be appreciated that other structures may be employed without departing from the underlying concepts of this invention where such sealing structures are known in the art. Moreover, while the shapes of the receptacles in each instance have been described as cylindrical, other shaped receptacles could certainly be used. For example, receptacles of square shaped cross-section could be employed with the snap together locking members such as those shown in Figure 8 or other locking members where the receptacles have circular mouths. Non-circular receptacle bodies could be employed provided the males and end connector structures are circular so as to mate with the lock members such as those shown in Figures 7 and 13. For example, the receptacles could have circular, oval or rectangular (including square) cross-sections or even other cross-sectional configurations. Accordingly, the skilled artisan should appreciate that modifications may be made to this invention without departing from the inventive concept therein.

Further, from the above description, it should be appreciated that the present invention also contemplates a method of storage and inventory of small items, such as medications, including medications that are controlled substances. The methodology according to the present invention has been mentioned from time to time in describing the structures of this invention. In addition, any inventorying steps inherent in the structures described above are included in this methodology.

It should be appreciated from the foregoing, then, that the present invention also contemplates a method for storing a bulk quantity of items in selected sub-quantities for inventory, control and dispensing. Here, the method may include any of the steps inherent in the structures described above. Primarily, the method includes the step of placing a selected sub-quantity of items in each one of a plurality of receptacles that each has an interior. The method also includes the step of interlocking a plurality of receptacles in a stacked array such that there is an uppermost receptacle. This interlocking is accomplished in such a manner so as to prevent access to the interior of each receptacle except for the uppermost receptacle when in a joined state. Adjacent receptacles in the stacked array are interlocked by

a lock member so that the adjacent receptacles can only be separated from one another by destroying at least a portion of the lock member. The general method may include the step of providing a reusable lid member to enclose the interior of the uppermost receptacle. This method may also include the step of dispensing first the sub-quantity of items in the upper most receptacle and thereafter separating the uppermost receptacle from the stacked array such that an adjacent receptacle becomes the uppermost receptacle in the stacked array.

Accordingly, the present invention has been described with some degree of particularity directed to the exemplary embodiments of the present invention. It should be appreciated, though, that the present invention is defined by the following claims construed in light of the prior art so that modifications or changes may be made to the exemplary embodiments of the present invention without departing from the inventive concepts contained herein.